

PART III

PHYSICAL DESCRIPTION

Physical Regions of Washington

On the basis of surface features, Washington may be divided into eight major regions. Agricultural settlement is influenced by factors of topography, climate, soil, forest vegetation and water resources distinctive to each of the physiographic regions. Each has become a different type of farming area as settlers have learned to adapt crops and livestock to the conditions, or have improved limitations through drainage or irrigation.

Costal Plains

A narrow, sandy plain with shallow bays, tidal flats, stream deltas and low headlands lies between the coastline and the Coast Range. It extends from the Columbia River mouth almost to Cape Flattery, being widest and lowest in the Grays Harbor and Willapa Bay districts. The climate is mild and damp with a long growing season, but it is too cool, cloudy and wet for most crops. Originally, this area was covered with heavy forests but much of it is now covered with woodlands. Lumbering and manufacture of wood products is the main industry. Farming is largely livestock and dairying using the low uplands and drained areas in the lower Chehalis River Valley. Cranberry growing is important and well-adapted to numerous, boggy areas in the Grays Harbor and Willapa Bay regions. The shallow bays are also used for oyster culture. Fishing is common in the rivers and coastal banks.

Coast Range

The Coast Range is an uplifted area of sedimentary and metamorphic rocks divided into the Olympic Mountains and the Willapa Hills. The Olympics tower to nearly 8,000 feet in a dome-like structure, carved deeply by rivers. These mountains have the heaviest precipitation in the state. Snowfields and heavy forest cover the mountains. Most of the wilderness area is within the Olympic National Forest and Olympic National Park, being managed for recreation, wildlife and timber. Farm settlement is limited to some foothill river plains and coastal terraces such as the Dungeness and Port Angeles districts along the Strait of Juan de Fuca. Here in the lee of the mountains, rainfall is moderate and irrigation is practiced by some livestock farmers. The Willapa Hill country is wet, heavily forested and carved into numerous narrow valleys. Logging is the main industry, combined with livestock farming in the upper Chehalis River Valley and along the banks of the Columbia River. Wet climate, hilly topography and the difficulty of clearing stump land retards agriculture.

Willamette-Puget Sound Lowland

A broad lowland, described as a trough or valley, lies between the Coast Range and the Cascade Mountains. The northern part is the Puget Sound Lowland which has been glaciated and is occupied by the sea in the lowest sections. The continental glacier reached slightly south of Olympia. Under a warming climate it melted and geologists believe it receded about 25,000 years ago, leaving an infertile plain of moraines and outwash gravels, sands and clays

known today as the Puget Glacial Drift Plain. Its rolling surface has numerous lakes and bogs. Most of the major cities--Seattle, Tacoma, Everett, Bellingham and Olympia--have been built on the moraines bordering the Sound. Rivers such as the Nooksack, Skagit, Snoqualmie, White and Puyallup have built up deltas and floodplains over the older gravelly plains. These narrow valleys are more fertile than the older glacial plains and support numerous small dairy, vegetable, and berry farms. Most of the gravelly areas are wooded with a second-growth forest and are used for pastures. In the southern part of the Willamette-Puget Sound Lowland there are two large valleys--the Cowlitz and Chehalis. They drain a low, hilly area with several flat prairies and bottomlands.

Agriculture is handicapped by poor drainage and flooding of the river deltas and plains, by heavy winter rainfall, by cloudy but dry summers, by coarse, gravelly upland soils and by densely wooded land which is costly to clear. Advantages are mild climate and a location close to major markets for farm products such as milk, poultry and vegetables.

Cascade Mountains

The Cascades are a wide and high topographic and climatic barrier which separates western and eastern Washington. The range is made up of sedimentary, igneous and metamorphic rocks which have been carved by glaciers and streams. High, isolated volcanic cones of lava such as Mt. Adams (12,307 feet), Mt. Rainier (14,408 feet) and Mt. Baker (10,791 feet), appear upon the older Cascade rocks. The Cascade crest varies between 10,000 and 3,000 feet and is higher and more rugged in northern Washington. Roads and railroads have been built across its lower passes in central and southern Washington. The Columbia River has cut a deep gorge and the lowest pass through the barrier. The western slope is wet and heavily forested with Douglas fir; the eastern slope is drier with a less dense pine forest. Nearly all classified as forest land, most of the area is in Federal ownership in five national forests and Mount Rainier National Park. Tree fruit farming in the eastern slope valleys of Wenatchee, Chelan, Methow, Naches and the Columbia Gorge is most important. Sheep and cattle summer grazing on alpine grasslands is another use. Deep, western slope valley bottoms such as the Skagit, Snoqualmie, Misqually, Cowlitz and Lewis also contain livestock farms. The area is vitally important as a watershed for irrigation and city drinking water and as a source of timber. Steep terrain, wet climate, short growing seasons and heavy forest vegetation are main handicaps for agriculture.

Columbia Basin

A low plateau of old lava rocks covered with stream and wind-deposited soils extends in a series of plains, ridges, coulees and hills from the Cascades to the eastern Washington border. The area is basin-like in structure, being higher around its margins and sloping inward to low and level central plains. It has been sharply eroded by the Columbia River and its interior tributaries--the Snake, Yakima, Palouse and Spokane Rivers. The basin has several sub-areas created by crustal movements and erosion.

- A. The Yakima Folds are a series of hilly ridges extending from the Cascades eastward into the lower part of the basin. The Yakima and

Columbia Rivers have cut gaps through the ridges and have built up plains in the troughs between them. The rich, alluvial plain of the Yakima River is an important irrigated valley.

- B. The Waterville Plateau is a tableland of thin soils overlaying basaltic rock at an elevation of 2,500 to 3,000 feet. It has gorges cut by the Columbia River and ancient glacial outwash streams once flowing in Moses and Grand Coulees. It is too high for irrigation and is used for dryland grain and livestock farming.
- C. The Channelled Scablands are a belt of dry terrain carved by ice-age rivers into a series of coulees. Bare rock is exposed in the coulees. Small plateaus between the old river channels have thin soils used for dryland farming. The Grand Coulee of this region has been developed into a major irrigation reservoir.
- D. The Palouse Hills consist of fertile deposits of wind-blown soil overlaying basaltic lava flows. After being deposited in large dunes, the formation was reshaped by streams into an intricate pattern of low, rounded hills. The hills receive 16 to 25 inches of rainfall annually and have deep, porous fertile soils. It is one of the richest farming areas of the Pacific Northwest.
- E. The Central Plains are low and relatively level expanses of soil, deposited by old streams crossing the Channelled Scablands and later by the flooding of the Yakima, Columbia, Snake and Walla Walla Rivers. Climate is desert-like (6-12 inches of precipitation per year). The lower lands of the area, the Quincy and Pasco Basins and the Walla Walla Valley, are irrigated. The Quincy Basin is a new irrigation area watered by Grand Coulee Dam.

Agriculture handicaps in Columbia Basin regions are mainly found in its dry, continental climate. Large irrigation systems built since 1900 have overcome much of the need for water on rich valley and basin soils. Dryland farming in higher areas is practiced widely, although occasional variations in rainfall, lack of snowfall, winterkill, water and wind erosion inflict damage to the field crops and to livestock ranges.

Okanogan Highlands

A portion of the Rocky Mountains, consisting of well-eroded, old granites, lavas and sedimentary rocks extends across north-central Washington. These are the Okanogan Highlands, the state's richest mineral area. Summit levels reach 4,000 to 5,000 feet with peaks exceeding 7,000 feet. Prominent north-south valleys are occupied by irrigated tree fruit and livestock farms. These are the Okanogan, Sanpoil, Kettle and Colville Valleys. The Columbia River Gorge through the Okanogan Highlands is occupied by the large man-made lake behind Grand Coulee Dam--Roosevelt Lake. Higher and wetter portions are forested with pine and larch, and are managed for timber and for livestock ranges by the United States Forest Service and the Bureau of Indian Affairs. Cold winter temperatures, short growing seasons, dry valley climates and remoteness from markets are farming handicaps.

Selkirk Mountains

The Selkirks, a range of the Rocky Mountain system, extend into the northeast corner of Washington. The rocks are old, mineralized granites and metamorphics reaching elevations of over 7,000 feet. The Pend Oreille River Valley at the base of the Selkirks is an agricultural area of narrow bottomlands settled by livestock farmers. Nearly all of the uplands are in Kaniksu National Forest. While climate is cool and growing seasons are short, the Pend Oreille Valley has an advantage of being relatively in close proximity to the Spokane metropolitan market area.

Blue Mountains

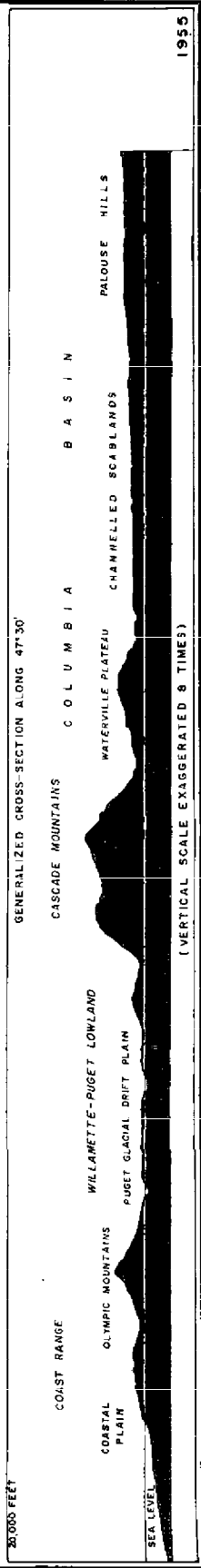
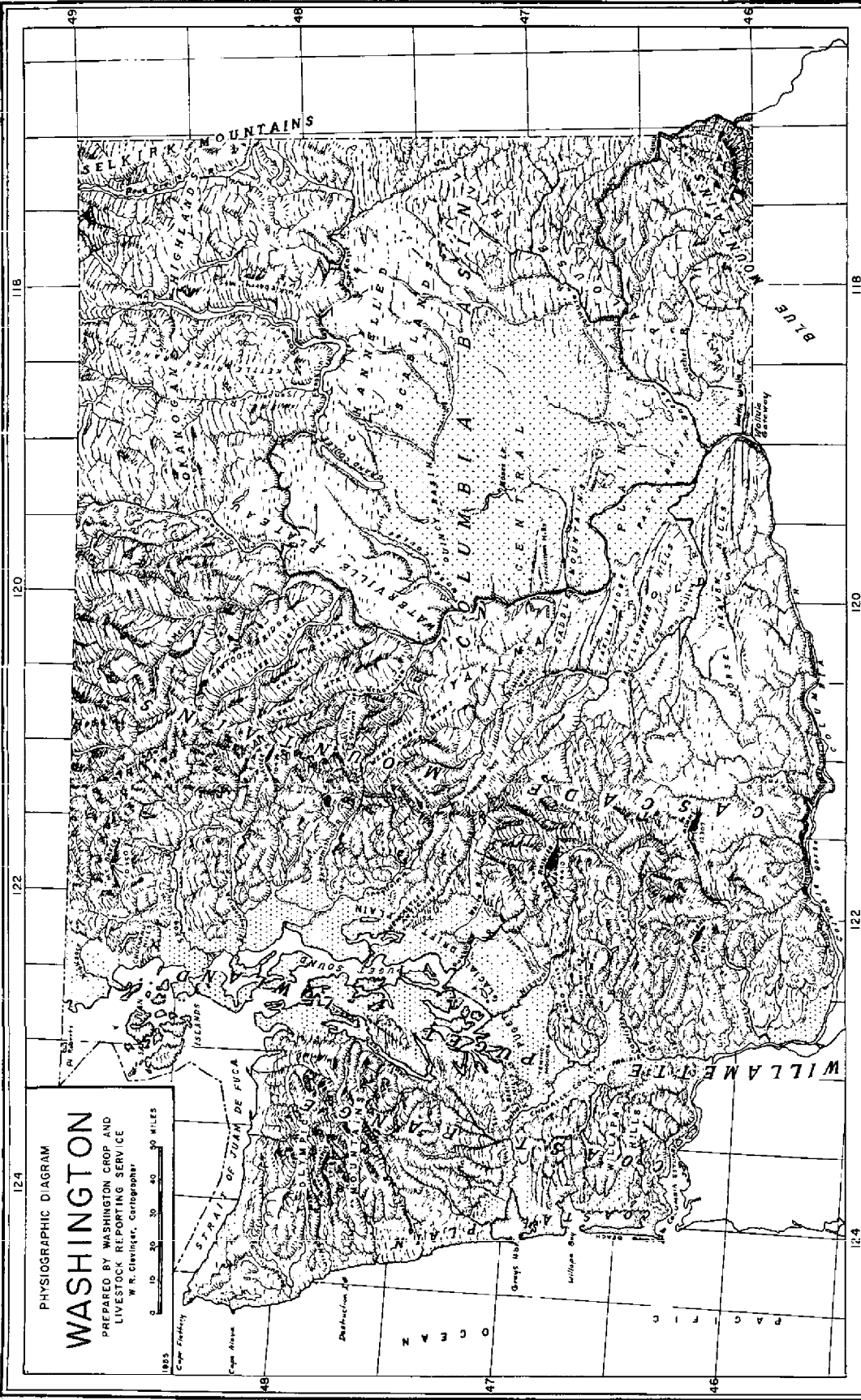
The Blue Mountains are an uplifted and eroded plateau extending into the southeastern corner of Washington. The strata are mainly ancient crystalline rocks which contain some minerals. The highest point of the mountains in the Washington section is Diamond Peak (6,401 feet) located on the divide between the Grande Ronde, Tucannon and Touchet Rivers. These rivers, and the Walla Walla River, have cut valleys into the plateau. Extensive pine forest and grassland areas are in the highlands within Umatilla National Forest, where rainfall is 30 to 40 inches. The Snake River has cut a deep valley and gorge across the lower parts of the mountains. The area is well developed agriculturally around its northern foothills where wind-blown soils are deep and irrigation systems are used. The Walla Walla and Tucannon Valleys are rich grain, legume and livestock areas of irrigation and dry farming. Grazing is an important use of the highlands by livestock ranchers in the upper valleys.

Physiography of Franklin County

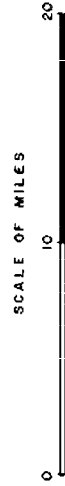
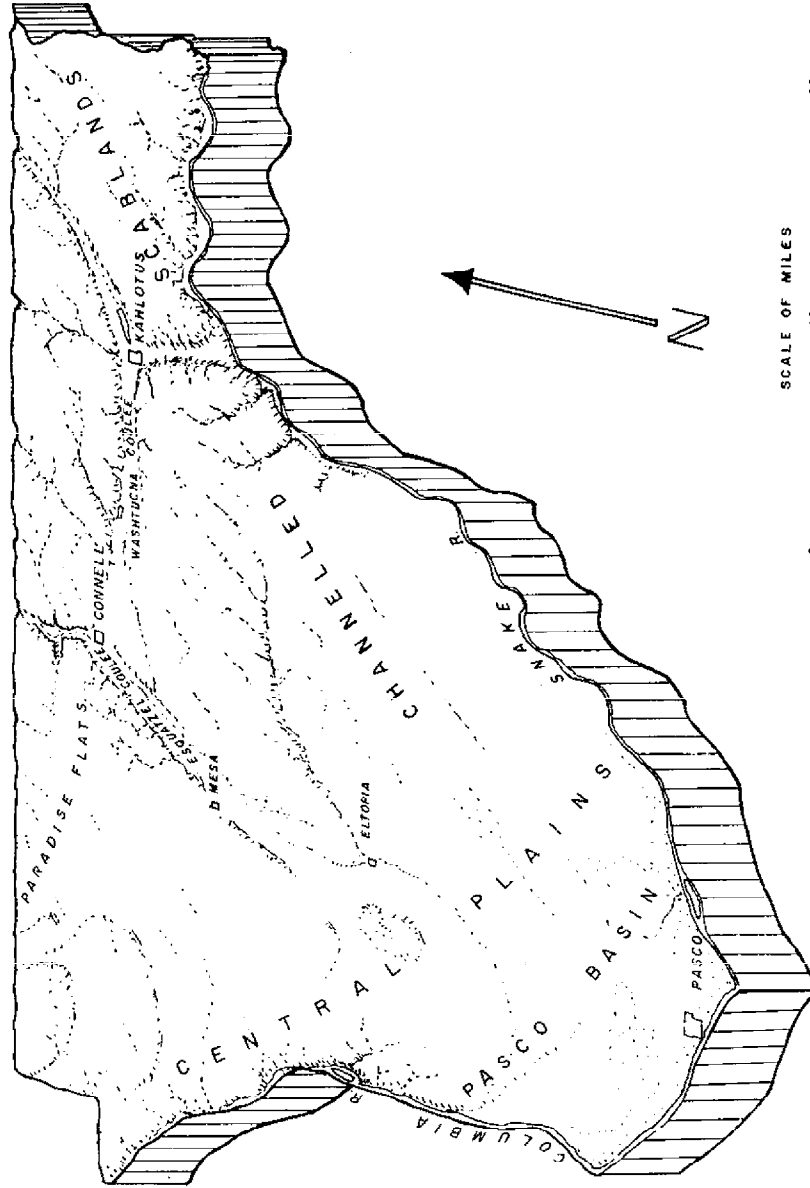
Franklin County lies in the Central Plains and Palouse Hills physiographic sections of the Columbia Basin. For the most part it consists of a rolling plain of glacial and wind deposited material with a few intrenched river-cut gorges and coulees. The Pasco Basin ranges from 350 feet in elevation on the Columbia River at Pasco to about 850 feet at Connell. Rivers of glacial meltwater deposited glacial material as an outwash plain during the Ice Age so the surface is rather uniform. In more recent geologic times this plain was partially covered with wind deposited sands and silts. There are local areas of bare rock and sand dune ridges. Narrow stream beds or coulees such as Esquatzel, Smith Canyon, Providence, and Dunnigan have cut channels in the plain. West of Eltopia and Connell the land is gently sloping and irrigable.

Northeastern Franklin County, on the western edge of the Palouse Hills, is a somewhat hilly area with stream cut gullies draining into Washtucna Coulee and the lower Snake River gorge. The hill and dune ridge area around Kahlotus and Washtucna Lake ranges from 900 to 1,500 feet in elevation and is too rough in most places for grain farming. The Snake River gorge is deep and steep, rising abruptly from 450 feet at river level to 1,500 feet at Rye Grass Flat on the rim.

From Pasco to north of Richland, where it enters a gorge, the Columbia River is bordered by a low, flat terrace. The river is deep and navigable with slow currents. Navigability has been improved by McNary Dam down-



TOPOGRAPHIC DIAGRAM FRANKLIN COUNTY



stream from Pasco. Pasco's river front is developed as a port for tugs, boats, and barges.

Land Classification and Soils

The U.S. Soil Conservation Service's Capability Classification is a grouping of soils that shows, in a general way, how suitable the soils are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. All soils are grouped into eight major capability classes. Class I contains soils with few limitations, the widest range of use, and the least risk of damage when used. Soils in other classes have progressively greater natural limitations; Classes V through VIII are generally unsuited for cultivation.

Although the Soil Conservation Service's 1949 land use capability map shows no Class I land in Franklin County, removal of the arid climate limitation by installation of irrigation systems has resulted in the upgrading of some cropland. A more recent reference (Washington Conservation Needs Committee, 1962) gives the following percentages of land use capability classes: Class I and II, 24 percent; Class III and IV, 35 percent; and Class V through VIII, 41 percent.

The best land and most productive soils, in Class I and II, are in northern Franklin County to the north and south of Connell. The area is a rolling plain uniformly covered with wind deposited soils, mainly loams of the Wheeler and Ritzville series. Moisture is usually sufficient under a summer fallow system to grow fair yields of wheat and barley on these rich, fine-textured dryland soils. Washtucna Coulee, a belt of rocky scabland soil, cuts across the area. A smaller area of good land, mainly Ephrata and Sagemore sandy loams, is located northeast of Pasco along the lower Snake River. West of Connell and Mesa is an area of Burke, Warden, and Ephrata sandy loams which have been made more productive by irrigation.

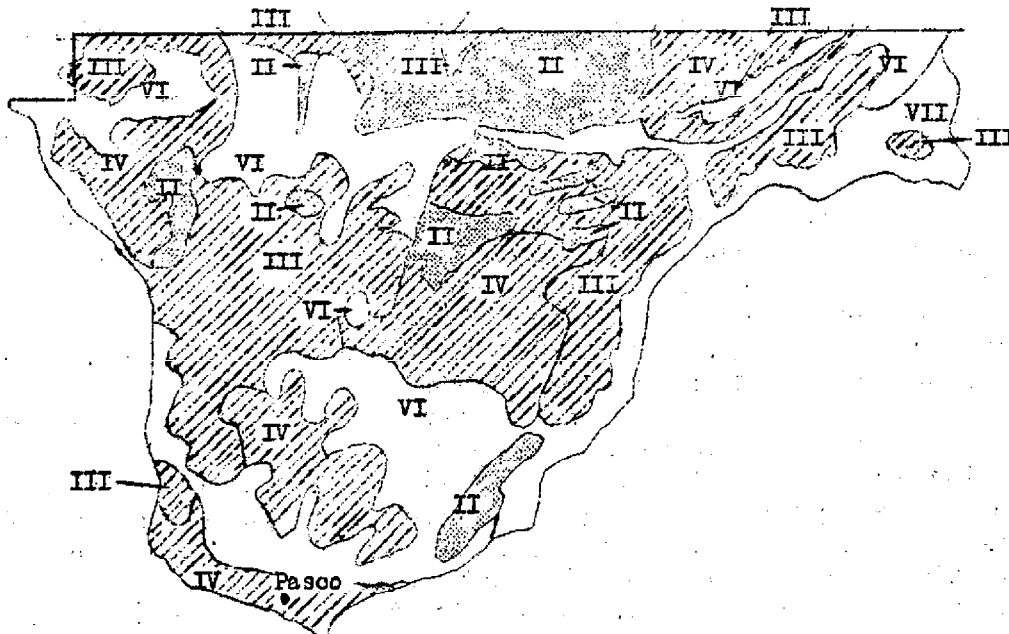
Large areas of Class III and IV land are located throughout the county. Principal soil series represented are the Koehler, Quincy, Winchester and Ephrata sands and sandy loams. Productivity of these dry, sandy to rocky soils has been raised where brought under irrigation. Class V, VI, and VII land, too stony or rough for cultivation, is found in the eroded, rocky scablands bordering the lower Snake River, the Columbia River, Washtucna Coulee, and Esquatzel Coulee. This non-irrigable land is used for livestock range and has limited capability for improvement. Some coulee bottoms contain alkaline, sandy soils of the Esquatzel and Washtucna series.

As one progresses eastward across Franklin County the annual precipitation gradually increases and soils show more development. Soils in the western half of the county are in the sierzem zone, formed under 5 to 10 inches of precipitation. (A soil zone is an area within which there is uniformity in those soil characteristics which are determined by climate.) The upper layer (A horizon) is typically 3 to 6 inches thick; low in organic matter, with a thin surface crust subject to polygonal cracking. The next layer (B horizon) is one of clay accumulation, is darker than the A horizon, and typically contains lime.

Soils in the western half of the county are in the brown zone, formed under 8 to 12 inches of precipitation. The A horizon is generally thicker than for sierozems (5 to 10 inches), grayish brown when dry, and neutral or nearly so in chemical reaction. The B horizon is commonly one of clay accumulation and is

neutral to basic in chemical reaction.

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| I | Very good land with deep, nearly level soil having few limitations. |
| II | Good land with minor limitations such as gentle slopes, moderately shallow soil, or slight erosion hazard. |
| III | Moderately good land with major limitations such as steep slopes, shallow soil, or severe erosion hazard. |
| IV | Fairly good land, suitable for occasional cultivation. Severe limitations require careful management. |
| V | Very well suited for grazing but unsuited for cultivation. |
| VI | Well suited for grazing with minor limitations such as moderately steep slopes or shallow soil. |
| VII | Fairly well suited for grazing, with major limitations such as steep slopes or shallow or droughty soils. |



Source: U.S. Soil Conservation Service Map: Washington, Generalized Classification of Land According to its Capability for Use, 1949.

Figure 5. Land Use Capability Classes in Franklin County.

Climate

Franklin County's climate is largely a continental, desert type. Precipitation is low, summers are warm and sunny, winters are cool. The climate is quite uniform over the county due to the essentially uniform elevation.

Mountain ranges surrounding the Columbia Basin influence its climate. The Rocky Mountains and ranges in southern British Columbia give protection from most severe winter storms moving southward across Canada, although at times some cold air flows into Washington's interior through north-south valleys near the Canadian Border. Such air drainage from the more severe storms sometimes results in several days of unusually low temperatures in mid-winter or a damaging late spring or early fall freeze.

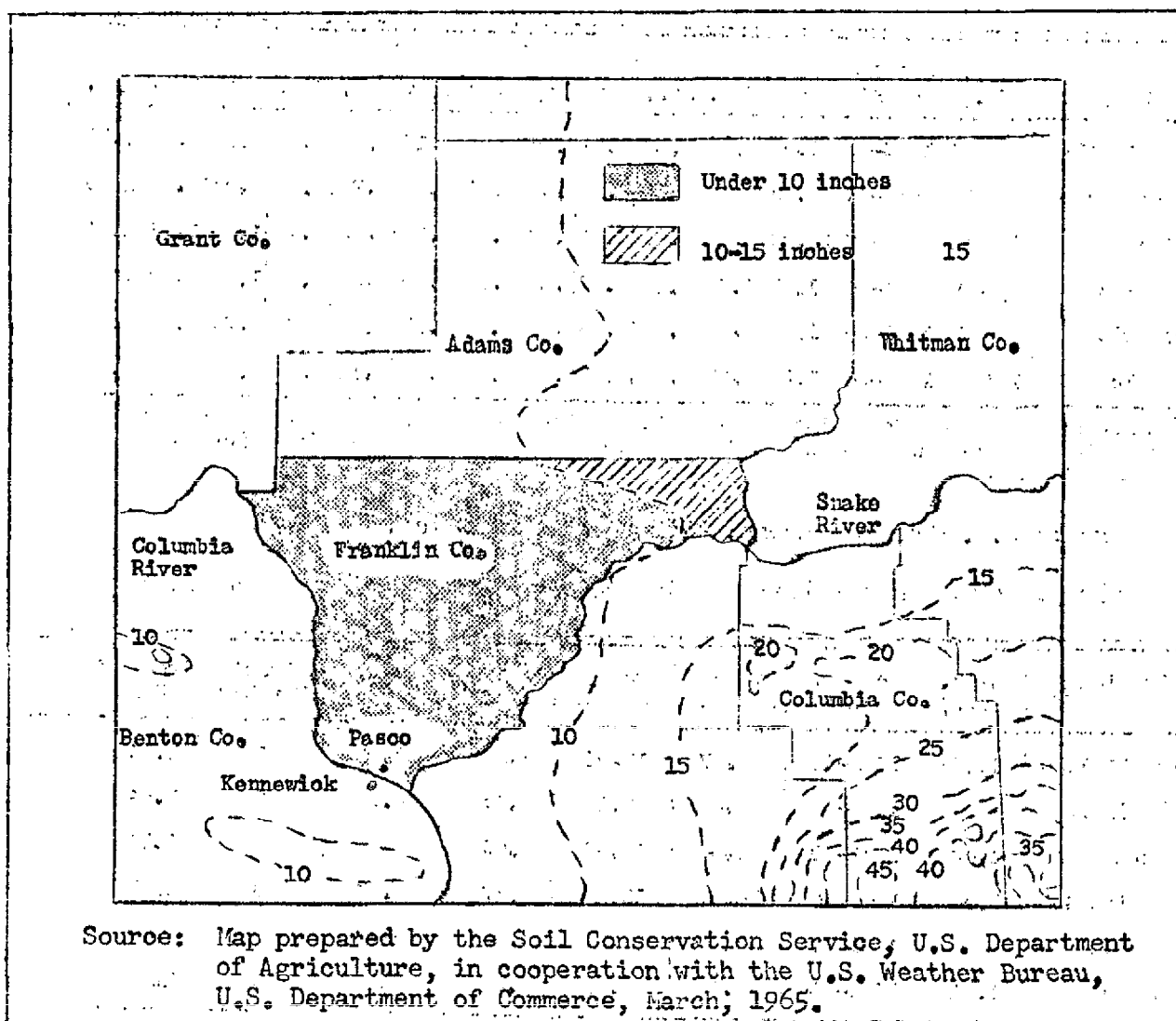


Figure 6. Distribution of Mean Annual Precipitation for Franklin and Neighboring Counties, 1930-1957. Dotted lines connect points of equal precipitation.

The Cascade Mountains, west of the Basin, rise to 4,000 to 7,000 feet with peaks over 10,000 feet, forming a north-south topographic and climatic barrier.

Prevailing westerly winds in the fall and winter bring a flow of relatively mild, moist air into western Washington. Cooling and condensation occur as the air rises along the slope of the Cascades, resulting in heavy precipitation along the western slope and near the summit. The air becomes warmer and drier as it descends the eastern slope and moves inland, resulting in decreasing annual precipitation from about 100 inches near the summit of the Cascades to less than 10 inches at lower elevations of the Columbia Basin.

Because of the small number of long term weather stations in Franklin County, data from appropriate nearby stations in neighboring counties have been included in the climatological tables herein. These are Hatton and Othello in Adams County and Kennewick in Benton County.

Table 4. Average Monthly Precipitation (Inches), Franklin County.

Stations ^{1/}	Elev. (ft.)	Period of Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Connell 12SE	1,078	1952-61	1.39	.99	.87	.61	.96	.65	.16	.48	.45	.76	.92	1.33
Eltopia 7WNW	895	1954-64	.93	.92	.71	.53	.93	.61	.18	.29	.45	.64	.99	1.29
Hatton 8E	1,428	1931-60	1.22	.92	.87	.70	.79	.86	.21	.22	.49	1.13	1.22	1.31
Kahlotus 4SW	1,340	1931-60	1.27	1.06	.89	.72	.83	.93	.16	.22	.46	1.08	1.23	1.52
Kennewick	392	1931-60	1.05	.82	.56	.48	.54	.63	.17	.14	.33	.73	.95	1.09
Othello	1,110	1942-60	1.23	.82	.62	.51	.72	.79	.20	.12	.42	.94	.87	.92

^{1/} Numbers and letters following names indicate distance in miles and direction from the town to the station. Hatton and Othello are in Adams County, and Kennewick is in Benton County.

Source: U.S. Weather Bureau, Climatological Office.

Table 5. Averages and Extremes in Precipitation (Inches), Franklin County.

Station ^{1/}	Elev. (ft.)	Period of Record	Average Annual	Greatest Annual	Least Annual	Greatest Monthly	Least Monthly	Greatest Daily
Connell 12SE	1,078	1952-61	9.57	11.92	6.26	2.90	0	1.55
Eltopia 7WNW	895	1954-64	8.47	10.14	7.43	2.66	0	1.64
Hatton 8E	1,428	1931-60	9.94	15.96	5.03	4.21	0	1.14
Kahlotus 4SW	1,340	1931-60	10.37	15.52	5.57	4.66	0	2.01
Kennewick	392	1931-60	7.49	12.90	4.05	3.57	0	1.42
Othello	1,110	1942-60	8.16	12.61	5.65	3.16	0	1.24

^{1/} Numbers and letters following names indicate distance in miles and direction from the town to the station. Hatton and Othello are in Adams County, and Kennewick is in Benton County.

Source: U.S. Weather Bureau, Climatological Office.

Only the northeastern corner of Franklin County, being a little higher than

the rest, receives more than 10 inches of precipitation per year. Kahlotus at 1,340 feet receives an average annual of 10.37 inches. Precipitation for other stations in the county and for Hatton, Othello and Kennewick averages 7.49 to 9.94 inches. Precipitation typically increases in fall to a peak of about an inch per month in mid-winter, decreases in spring, increases slightly with shower activity in May and June, and then drops off sharply in July and August. It is not unusual for a month or six weeks to pass without measurable rainfall in mid summer.

Rainfall associated with summer thunderstorms is usually light although hail and heavy showers sometimes occur. Snowfall is usually light. Snow depth seldom reaches a depth greater than 6 inches at Pasco, and seldom remains on the ground longer than two to four weeks. Warm Chinook winds frequently cause mid-winter thaws throughout the county, often resulting in rather severe soil erosion.

Low annual precipitation in eastern Franklin County's dryland wheat farming area necessitates summer fallowing to accumulate and hold moisture for grain crops. Sowing wheat in the fall enables plants to use moisture stored in the soil during the year when the ground lies fallow. Croplands in the western part of the county, in the South District of the Columbia Basin Project, are in the county's driest area and require irrigation for practically all crops.

Evaporation is high, as illustrated by the following average monthly evaporation losses at Othello: April 5.54, May 7.79, June 9.26, July 12.29, August 10.21, September 6.76, and October 3.10 inches. Water lost through evaporation from lakes and reservoirs is estimated to reach about 40 inches annually.

Strong westerly winds associated with rapidly moving storms sometimes cause considerable erosion and blowing dust. During the winter, moist air crossing the Cascades and mixing with colder air in the inland basin results in considerable cloudiness and some fog. The number of clear days each month increases rapidly in the spring, from about five in the winter to 20 or more in the summer.

Temperatures often exceed 100° F. in the summer and dip to the minus 20's in the wintertime throughout the county. The highest temperature recorded in recent years is 115° F. at Kennewick, and the lowest a minus 30° F. at Hatton. Days are warm and nights cool in the summer throughout the county, with July temperatures ranging from average minimums in the 50's to average maximums around 90° F. Winter temperatures show less daily fluctuation; January minimums average 20° F. to 25° F. and maximums, 10 to 15 degrees higher.

The growing season (the average number of days from the last 32° F. frost in the spring to the first such occurrence in the fall) ranges from 135 days at Hatton to 184 days at Kennewick. Growing seasons are shorter and killing frosts come earlier in the higher dryland farming region around Kahlotus. Frost also settles in low pockets where air drainage is poor.

Table 6. Temperature Data. Average Maximum, Average Minimum, Mean, Highest and Lowest Temperature Each Month, Franklin County.

Station 1/		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
Eltopia 7WNW 1954-1964	Av. Max.	36.1	45.3	54.4	64.9	73.5	82.3	88.5	86.6	78.7	63.8	47.1	38.8	63.3
	Av. Min.	21.8	26.9	31.6	37.6	44.6	51.0	55.7	54.2	48.5	39.1	29.7	25.7	38.8
	Mean	28.9	36.0	42.9	51.2	59.0	66.6	72.1	70.4	63.6	51.4	38.4	32.2	51.0
	Highest	60	64	80	85	97	107	109	110	99	86	71	63	110
	Lowest	-24	-14	7	24	25	36	38	41	31	25	-9	-10	-24
Hatton SE 1931-1960 (Adams County)	Av. Max.	35.0	41.8	53.2	64.3	73.7	80.3	90.8	88.2	78.9	64.1	46.3	38.2	62.9
	Av. Min.	21.2	25.5	30.6	35.3	41.8	47.7	53.0	51.0	45.2	37.2	29.9	26.0	37.0
	Mean	28.1	33.6	41.9	49.8	57.7	64.0	71.9	69.6	62.1	50.7	37.8	32.1	49.9
	Highest	59	65	77	90	100	105	110	105	102	90	68	62	110
	Lowest	-28	-30	7	12	24	28	37	34	21	6	-10	-6	-30
Kennewick 1931-1960 (Benton County)	Av. Max.	38.5	46.2	57.7	68.3	76.7	83.0	91.3	88.3	79.8	66.2	49.7	42.0	65.6
	Av. Min.	25.1	28.8	34.5	40.6	47.8	53.6	58.8	56.5	49.4	41.1	32.7	30.0	41.6
	Mean	31.8	37.5	46.1	54.5	62.3	68.3	75.1	72.4	64.6	53.7	41.2	36.0	53.6
	Highest	64	71	82	94	102	106	115	106	100	89	76	68	115
	Lowest	-19	-23	10	18	30	37	43	40	30	14	0	-8	-23
Othello 1942-1960 (Adams County)	Av. Max.	34.9	43.5	53.6	64.9	74.3	80.8	91.9	88.2	80.2	64.5	46.3	37.6	63.3
	Av. Min.	20.1	25.5	29.7	36.2	44.2	50.2	55.8	53.7	47.1	38.1	28.3	24.8	37.8
	Mean	27.5	34.5	41.7	50.6	59.3	65.5	73.5	71.0	63.7	51.3	37.3	31.2	50.6
	Highest	60	63	79	88	99	103	108	107	102	91	68	63	108
	Lowest	-26	-26	6	16	23	31	34	36	27	15	-8	-9	-26

1/ Numbers and letters following names indicate distance in miles and direction from the town to the station.

Source: U.S. Weather Bureau, Climatological Office.

Table 7. Probability of Freezing Temperatures, Franklin County. 1/

Station	Temp. (°F.)	Probability -- Summer					Probability -- Fall					Growing Season Mean Length (Days)
		90%	75%	50%	25%	10%	10%	25%	50%	75%	90%	
Hatton SE	32	Apr. 24	May 5	May 19	Jun 1	Jun 14	Sep 8	Sep 19	Oct 1	Oct 13	Oct 24	135
	28	Apr 3	Apr 15	Apr 29	May 13	May 24	Sep 21	Oct 1	Oct 14	Oct 26	Nov 6	168
	24	Mar 6	Mar 16	Apr 1	Apr 14	Apr 26	Oct 2	Oct 13	Oct 25	Nov 6	Nov 17	207
	20	Jan 29	Feb 17	Mar 3	Mar 17	Mar 29	Oct 24	Nov 4	Nov 16	Nov 28	Dec 11	258
	16	—	Jan 29	Feb 14	Feb 28	Mar 13	Nov 5	Nov 16	Dec 1	Dec 16	—	290
Kennewick	32	Mar 18	Mar 30	Apr 13	Apr 26	May 8	Sep 21	Oct 2	Oct 14	Oct 26	Nov 6	184
	28	Mar 6	Mar 18	Apr 1	Apr 14	Apr 26	Oct 4	Oct 15	Oct 28	Nov 8	Nov 19	210
	24	Feb 14	Feb 26	Mar 12	Mar 25	Apr 6	Oct 18	Oct 28	Nov 10	Nov 22	Dec 5	243
	20	Jan 22	Feb 10	Feb 24	Mar 10	Mar 22	Nov 2	Nov 13	Nov 28	Dec 19	—	277
	16	—	Jan 15	Feb 5	Feb 20	Mar 5	Nov 13	Nov 26	Dec 13	—	—	311
Othello	32	Apr 11	Apr 22	May 7	May 21	Jun 2	Sep 12	Sep 23	Oct 5	Oct 17	Oct 28	151
	28	Apr 1	Apr 14	Apr 26	May 11	May 22	Sep 27	Oct 5	Oct 18	Oct 30	Nov 9	175
	24	Mar 9	Mar 21	Apr 4	Apr 18	Apr 30	Oct 5	Oct 16	Oct 28	Nov 10	Nov 21	207
	20	Feb 15	Feb 28	Mar 13	Mar 26	Apr 8	Oct 17	Oct 28	Nov 9	Nov 23	Dec 8	241
	16	Jan 27	Feb 12	Feb 24	Mar 13	Mar 24	Oct 23	Nov 3	Nov 15	Dec 1	—	263

1/ To illustrate the data in the table, we find that the 50 percent probability of a 32° spring freeze for Hatton is May 19th. But there is also a 25 percent chance (1 year in 4) that a 32° freeze will occur as late as June 1st, and 10 percent chance as late as June 14th.

Source: U.S. Weather Bureau, Climatological Data--Washington, 1962.

Vegetation and Wildlife

Natural vegetation has been modified or completely replaced over much of Franklin County by agriculture, urban development, and other activities. Forest growth is prohibited by the arid climate. The most extensive range type consists of bunchgrass vegetation, occurring at higher elevations over the northern half of the county. Dominant grasses on good condition rangeland are bluebunch wheatgrass, Sandberg bluegrass and Idaho fescue.

Much of the western, drier part of the county is covered by sagebrush-grass vegetation where not greatly disturbed. Principal shrubs and browse plants are sagebrush, rabbitbrush, and antelope bitterbrush on the better sites. Major grasses include bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, needle-and-thread grass, and squirreltail. Plant cover on the more rocky sites in the Channelled Scablands is quite sparse. Annual grasses, principally cheatgrass, have taken over some rangeland.

Franklin offers some of the best pheasant hunting in Washington. The 1962 season saw a take of 34,230 birds. Waterfowl hunting along the Columbia River and open water in the irrigation project is good, as illustrated by the 1962 kill of 24,020 ducks and 7,160 geese. Irrigation, production of forage crops, and creation of edge cover between cultivated and non-cultivated areas have generally benefited pheasant, quail, mourning dove, Hungarian partridge, cottontail, and other upland game populations. The county supports small antelope and deer herds--50 of each were taken in 1962.

The Washington Department of Game has been active in keeping Camp Lakes, Kahlotus Lake, and Scootenai Reservoir stocked with trout or bass. The Columbia, Snake, and Palouse Rivers are fished for steelhead trout and spiny ray fish. Development of farm ponds and lands for game and fish production is a potential source of income for Franklin County farmers.

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